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(54) **PHARMACEUTICAL COMPOSITIONS CONTAINING OLIGOSACCHARIDES, THE NOVEL OLIGOSACCHARIDES AND PREPARATION THEREOF**

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(58) **Field of Search** **514/53, 54, 56, 514/62; 536/18.7, 21, 54, 55, 55.1, 55.2, 123.1**

(56) **References Cited**

U.S. PATENT DOCUMENTS

- | | | | | | |
|-------------|---|--------|--------------------|-------|---------|
| 4,956,347 A | * | 9/1990 | Ban et al. | | 514/54 |
| 5,145,841 A | * | 9/1992 | Cullis-Hill et al. | | 514/54 |
| 5,389,618 A | | 2/1995 | Debrie | | |
| 5,449,688 A | | 9/1995 | Wahl et al. | | |
| 5,489,578 A | * | 2/1996 | Rosen et al. | | 514/61 |
| 5,705,401 A | * | 1/1998 | Masters et al. | | 436/518 |

FOREIGN PATENT DOCUMENTS

- | | | |
|----|-------------|--------|
| FR | 2548672 | 7/1983 |
| WO | 9001501 | 2/1990 |
| WO | WO 94/29352 | * |
| WO | WO 95/09637 | * |
| WO | 9614425 | 5/1996 |

OTHER PUBLICATIONS

Lee et al. Journal of Chromatography, 1981, vol. 212, pp. 65–73.*

McLean et al. Eur. J. Biochem. 1984, vol 145, pp. 607–615.*
Camu William et al; Purification of Embryonic Rat Motoneurons by Panning on a Monoclonal Antibody to the Low-Affinity NGF Receptor; J., Neurosci.; vol. 44, pp. 59–70; (1992).

Chandler Charles E. et al; A Monoclonal Antibody Modulates the Interaction of Nerve Growth Factor with PC12 Cells; J. Biol. Chem.; vol. 259, No. 11; pp. 6882–2889; (1984).

Larkjaer Anni et al; Isolation and Characterization of Hexasaccharides Derived from Heparin. Analysis by HPLC and Elucidation of Structure by ¹ H NMR; Carbohydrate Research; vol. 266; pp. 37–52; (1995).

Rice Kevin G. et al; Study of Structurally Defined Oligosaccharide Substrates of Heparin and Heparan Monosulfate Lyases; Carbohydrate Research; vol. 190; pp. 219–233; (1989).

Saneto Russell P. et al; Neuronal and Glial Cells: Cell Culture of the Central Nervous System; Neurochemistry: A Practical Approach (eds. Turner, A. Bacheland, H.S.); pp. 27–63; (1987).

Schnaar Ronald L. et al; Separation of Cell Types from Embryonic Chicken and Rat Spinal Cord: Characterization of Motoneuron–Enriched Fractions; J. Neuosci.; vol. 1; No. 2; pp. 204–217; (1981).

Shellito Judd E. et al; Regulation of Nitric Oxide Release by Macrophages after Intratracheal Lipopolysaccharide; Am. J. Respir. Cell Mol. Biol.; vol. 13, pp. 45–53; (1993).

Yamashita Masamichi et al; Induction of Nitric Oxide Synthase by Lipopolysaccharide and its Inhibition by Auranolin in RAW 264.7 Cells; Eur. J. Pharmacol.; vol. 338, pp. 151–158; (1997).

* cited by examiner

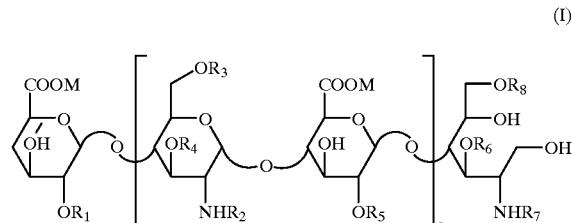
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(57) **ABSTRACT**

The present invention relates to pharmaceutical compositions containing as an active ingredient at least one oligosaccharide of formula:



to novel oligosaccharides of formula (I), to mixtures thereof and to methods for their preparation.

34 Claims, No Drawings